

WHAT IS CLAIMED IS:

1. In combination with a plurality of trays for holding warm food, each tray having a bottom wall and side and end walls extending up from the bottom wall to an upper rim defining an open top of the tray, an oven for transferring heat to food in the trays, said oven comprising:

a cabinet having an interior;

partitions in the cabinet dividing said interior into a plurality of separate, thermally isolated holding compartments each adapted for removably receiving a tray of said plurality of trays;

a plurality of heat sources, at least one heat source being positioned above each compartment adapted for activation to emit radiant heat to the food in the trays to warm the food; and

a control mechanism for controlling operation of the heat sources independent of one another whereby the temperature in each compartment may be independently controlled.

2. A combination as set forth in claim 1 wherein said control mechanism comprises a timer control for setting a duration of holding time for each compartment independent of the other compartments, said duration of holding time comprising at least a duration of heated holding time during which a respective heat source is activated.

3. A combination as set forth in claim 2 wherein said duration of holding time comprises the sum of said duration of heated holding time and a duration of non-heated holding time during which a respective heat source is not activated.

4. A combination as set forth in claim 1 wherein said control mechanism is operable to activate and deactivate at

least one of said heat sources during successive duty cycles thereby to maintain the food in a respective compartment at a selected holding temperature for a duration of heated holding time, each duty cycle comprising a heating interval followed by a non-heating interval.

5. A combination as set forth in claim 4 wherein said control mechanism comprises a duty-cycle control for controlling the length of the heating interval of a duty cycle.

6. A combination as set forth in claim 4 wherein said control mechanism comprises a temperature control for selecting the holding temperature in each compartment.

7. A combination as set forth in claim 6 wherein said control mechanism is operable to deactivate the heat source in at least one compartment while the temperature of the food in said compartment cools down to said selected holding temperature during a duration of non-heated holding time, and for then activating and deactivating the heat source in said at least one compartment during said successive duty cycles thereby to maintain the food in the compartment at said selected holding temperature for said duration of heated holding time.

8. A combination as set forth in claim 7 further comprising a forced air mechanism for delivering cooling air into the compartments, said control mechanism being operable to activate the forced air mechanism during said duration of non-heating holding time.

9. A combination as set forth in claim 7 wherein said control mechanism comprises a timer control for setting a duration of holding time for each compartment independent of the other compartments, said duration of holding time

comprising at least a duration of heated holding time during which a respective heat source is activated.

10. A combination as set forth in claim 9 wherein said timer control is operable for setting a duration of holding time comprising the sum of said duration of non-heated holding time and said duration of said heated holding time.

11. A combination as set forth in claim 6 wherein said control mechanism is operable to activate the heat source in at least one compartment to raise the temperature in the compartment to said selected holding temperature during a duration of rethermalizing holding time, and for then activating and de-activating the heat source in said at least one compartment during said successive duty cycles thereby to maintain the food in the compartment at said selected holding temperature for said duration of heated holding time.

12. A combination as set forth in claim 11 wherein said control mechanism comprises a timer control for setting a duration of holding time comprising at least said duration of holding time comprising at least a duration of heated holding time during which a respective heat source is activated.

13. A combination as set forth in claim 12 wherein said timer control is operable for setting a duration of holding time comprising the sum of said duration of rethermalizing holding time and said duration of said heated holding time.

14. A combination as set forth in claim 1 further comprising a forced air mechanism under the control of said control mechanism for delivering forced air into the compartments.

15. A combination as set forth in claim 14 wherein said forced air mechanism comprises lower air ducting for conveying forced air into the compartments at locations below the trays in the compartments.

16. A combination as set forth in claim 15 wherein said forced air mechanism comprises upper air ducting for conveying forced air out of the compartments at locations above the trays in the compartments.

17. A combination as set forth in claim 16 wherein said forced air mechanism further comprises a fan system for moving air through said upper and lower air ducting.

18. A combination as set forth in claim 17 wherein said fan system is operable in a first mode to circulate air in one direction along a flow path comprising said lower air ducting, said compartments and said upper air ducting, and in a second mode to circulate air in an opposite direction along said flow path.

19. A combination as set forth in claim 18 further comprising heat sources positioned in at least one of said upper and lower air ducting for heating air flowing along said flow path.

20. A combination as set forth in claim 19 wherein said control mechanism further comprises temperature sensors in the compartments for sensing the temperatures in the compartments, said control mechanism being operable in response to signals from said temperature sensors to control the operation of said fan system.

21. A combination as set forth in claim 14 wherein said forced air is convective heating air.

22. A combination as set forth in claim 21 wherein said trays have holes therein for allowing forced air entering the compartments to flow through the holes and thereby remove moisture from the food therein.

23. A combination as set forth in claim 1 wherein said heat source is selected from a group comprising a quartz infrared heat source, a halogen infrared heat source, a ceramic infrared heat source, and a resistance heating element embedded in magnesium oxide.

24. A combination as set forth in claim 1 wherein at least some of said trays have one or more vent holes openings for venting moisture from the tray.

25. A combination as set forth in claim 24 wherein different trays have different hole patterns.

26. A combination as set forth in claim 24 wherein different trays have different hole sizes.

27. A combination as set forth in claim 1 further comprising a panel positioned between a heat source and its respective compartment.

28. A combination as set forth in claim 1 wherein said partitions prevent the transfer of food flavors between the compartments.

29. A combination as set forth in claim 1 wherein said heat source comprises one or more electric heating elements located over said trays.

30. A combination as set forth in claim 1 wherein the power delivered by each heat source ranges from 40-600 watts.

31. A combination as set forth in claim 1 further comprising vertically spaced shoulders in each compartment at opposite sides of the compartment for supporting a tray at different elevations in the compartment.

32. A combination as set forth in claim 1 wherein said compartments have different widths.

33. A combination as set forth in claim 1 wherein said heat sources comprise electric resistance heating elements.

34. A method of controlling the operation of an oven, said oven comprising a cabinet, a plurality of separate, thermally isolated holding compartments in the cabinet, each compartment being adapted for removably receiving a tray for containing food, and a heat source above a respective tray for emitting radiant heat to the food in the tray to warm the food, said method comprising activating and deactivating each heat source during successive duty cycles thereby to maintain the food in a respective compartment at a selected holding temperature for a duration of heated holding time, each duty cycle comprising a heating interval followed by a non-heating interval.

35. A method as set forth in claim 34 further comprising varying the length of the heating interval of a duty cycle.

36. A method as set forth in claim 34 further comprising maintaining at least two compartments at different selected holding temperatures.

37. A method as set forth in claim 34 further comprising placing a tray containing food at a temperature above said selected holding temperature into a respective

compartment, deactivating the heat source in the compartment while the food in the compartment cools down during a duration of non-heated holding time, and then activating and deactivating the heat source in said at least one compartment during said successive duty cycles thereby to maintain the food in the compartment at said selected holding temperature for said duration of heated holding time.

38. A method as set forth in claim 37 further comprising delivering cooling air into the compartments during said duration of non-heating holding time.

39. A method as set forth in claim 37 further comprising placing a tray containing food at a temperature below said selected holding temperature into a respective compartment, activating the heat source in the compartment to raise the temperature in the compartment to said selected holding temperature during a duration of rethermalizing holding time, and then activating and deactivating the heat source in said at least one compartment during said successive duty cycles thereby to maintain the food in the compartment at said selected holding temperature for said duration of heated holding time.

40. A method as set forth in claim 34 further comprising setting a duration of holding time for each compartment independent of the other compartments, said duration of holding time comprising at least a duration of heated holding time during which a respective heat source is activated.

41. A method as set forth in claim 40 wherein said duration of holding time comprises the sum of said duration of heated holding time and a duration of non-heated holding

time during which a respective heat source is not activated.

42. A method as set forth in claim 34 further comprising conveying convective heating air into the compartments.

43. A method as set forth in claim 42 further comprising conveying said convective heating air into the compartments at locations below the trays for flow in a generally upward direction toward said trays.

44. A method as set forth in claim 42 further comprising conveying said convective heating air into the compartments at locations above the trays for flow in a generally downward direction toward said trays.

45. A method as set forth in claim 42 further comprising circulating heating air through the compartments in one direction and then reversing the direction of air flow to circulate heating air through the compartments in a different direction.

46. A method as set forth in claim 34 further comprising varying the vertical position of at least one tray in a respective compartment.

47. A method of controlling the operation of an oven, said oven comprising a cabinet, a plurality of separate, thermally isolated holding compartments in the cabinet, each compartment being adapted for removably receiving a tray for containing food, and heat sources above respective trays adapted for activation to emit radiant heat to the food in the trays to warm the food, said method comprising:

setting a selected holding temperature for each compartment;

setting a duration of holding time for each compartment, said duration of holding time comprising a duration of heated holding time; and

activating each heat source during a respective duration of heated holding time thereby to maintain the food in a respective compartment at said selected holding temperature.

48. A method as set forth in claim 47 wherein said duration of holding time comprises the sum of said duration of heated holding time and a duration of non-heated holding time during which a respective heat source is not activated.

49. A method as set forth in claim 47 further comprising placing a tray containing food at a temperature above said selected holding temperature into a respective compartment, deactivating the heat source in the compartment while the temperature in the compartment cools down to said selected holding temperature during a duration of non-heated holding time, and then activating and deactivating the heat source in said at least one compartment during successive duty cycles thereby to maintain the food in the compartment at said selected holding temperature for said duration of heated holding time.

50. A method as set forth in claim 49 further comprising delivering cooling air into the compartments during said duration of non-heating holding time.

51. A method as set forth in claim 50 further comprising placing a tray containing food at a temperature below said selected holding temperature into a respective compartment, activating the heat source in the compartment to raise the temperature in the compartment to said

selected holding temperature during a duration of rethermalizing holding time, and then activating and deactivating the heat source in said at least one compartment during said successive duty cycles thereby to maintain the food in the compartment at said selected holding temperature for said duration of heated holding time.

52. In combination with a plurality of trays for holding warm food, each tray having a bottom wall and side and end walls extending up from the bottom wall to an upper rim defining an open top of the tray, an oven for transferring heat to food in the trays, said oven comprising:

a cabinet having an interior for removably receiving said plurality of trays;

a plurality of covers covering the open tops of the trays, each cover having a metallic portion overlying the top of a respective tray;

a source for heating the metallic portion of each cover whereby the metallic portion is adapted to emit radiant heat to the food in the respective tray to warm the food in the tray; and

one or more openings in at least some of the covers for venting moisture from each tray having such a cover.

53. A combination as set forth in claim 52 wherein one or more of said covers are in sealing contact with the rims of respective trays.

54. A combination as set forth in claim 52 wherein one or more of said covers are spaced above the rims of respective trays by a distance no greater than one inch.

55. A combination as set forth in claim 52 wherein one or more of said covers are spaced above the rims of respective trays by a distance no greater than about 0.40 in.

56. A combination as set forth in claim 52 wherein said source comprises one or more electric heating elements located over said covers.

57. A combination as set forth in claim 56 wherein each heating element is enclosed in a housing affixed to an interior surface of the cabinet.

58. A combination as set forth in claim 52 wherein said source is spaced above each cover a distance less than 2.0 inches.

59. A combination as set forth in claim 52 wherein said source is spaced above each cover a distance less than 1.0 inches.

60. A combination as set forth in claim 52 further comprising a plurality of tray-receiving members in said cabinet, each being sized and configured for holding a single tray.

61. A combination as set forth in claim 60 wherein said tray-receiving members are heat sinks each having a bottom wall and side walls extending up from the bottom wall for receiving a tray therebetween.

62. A combination as set forth in claim 61 wherein the side walls of each heat sink have generally horizontal shoulders for supporting one of said covers over the tray.

63. A combination as set forth in claim 62 wherein each cover comprises a generally horizontal metal cross wall and legs extending down from the cross wall for bearing on the shoulders of a respective heat sink, the spacing between
5 the cross wall of the cover and the bottom wall of the heat sink being not substantially greater than the height of the tray received in the heat sink.

64. A combination as set forth in claim 52 wherein the combined areas of said one or more openings in a cover is less than 25% of the area of the open top of the tray it is covering.

65. A combination as set forth in claim 52 wherein the combined areas of said one or more openings in a cover is less than 5% of the area of the open top of the tray it is covering.

66. A combination as set forth in claim 52 wherein the combined areas of said one or more openings in a cover is less than 1% of the area of the open top of the tray it is covering.

67. A combination as set forth in claim 52 wherein the heat source is operable to heat each cover to a temperature ranging from 200-500° F.

68. A combination as set forth in claim 52 wherein the power delivered by said heat source to each cover ranges from 100-500 watts.

69. A cover for covering a tray received in an oven having a heat source therein, each tray having a bottom wall and side and end walls extending up from the bottom wall to an upper rim defining an open top of the tray, said cover comprising:
5

a metallic wall adapted to overlie the open top of tray for receiving heat from said heat source and for emitting radiant heat to the food in the tray to warm it; and

5 one or more openings in the cover for venting moisture from the tray.

70. A cover as set forth in claim 69 wherein said metallic wall extends generally horizontally over the tray, said cover further comprising legs extending down from the cross wall for supporting the cover in the oven over the tray.

71. A cover as set forth in claim 69 wherein the combined areas of said one or more openings is less than 25% of the area of the open top of the tray.

72. A cover as set forth in claim 71 wherein the combined areas of said one or more openings is less than 5% of the area of the open top of the tray.

73. A cover as set forth in claim 72 wherein the combined areas of said one or more openings is less than 1% of the area of the open top of the tray.